

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date  
4 August 2005 (04.08.2005)

PCT

(10) International Publication Number  
**WO 2005/071453 A1**

(51) International Patent Classification<sup>7</sup>: G02B 6/122, 6/12

(21) International Application Number:  
PCT/JP2005/001295

(22) International Filing Date: 25 January 2005 (25.01.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
2004-016589 26 January 2004 (26.01.2004) JP  
2004-188365 25 June 2004 (25.06.2004) JP  
2004-222250 29 July 2004 (29.07.2004) JP

(71) Applicant (for all designated States except US): THE FURUKAWA ELECTRIC CO., LTD. [JP/JP]; 6-1, Marunouchi 2-chome, Chiyoda-ku, Tokyo 1008322 (JP).

(72) Inventors; and

(75) Inventors/Applicants (for US only): NARA, Kazutaka [JP/JP]; c/o The Furukawa Electric Co., Ltd., 6-1, Marunouchi 2-chome, Chiyoda-ku, Tokyo 1008322 (JP). URABE, Haruki [JP/JP]; c/o The Furukawa Electric

Co., Ltd., 6-1, Marunouchi 2-chome, Chiyoda-ku, Tokyo 1008322 (JP). SAITO, Tsunetoshi [JP/JP]; c/o The Furukawa Electric Co., Ltd., 6-1, Marunouchi 2-chome, Chiyoda-ku, Tokyo 1008322 (JP). MORIMOTO, Masahito [JP/JP]; c/o The Furukawa Electric Co., Ltd., 6-1, Marunouchi 2-chome, Chiyoda-ku, Tokyo 1008322 (JP).

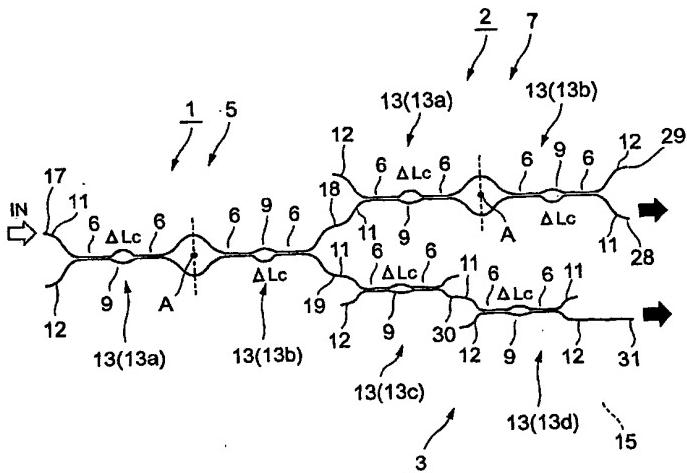
(74) Agent: IGARASHI, Kiyoshi; Room 908, Yokohamahi-gashiguchi Bldg., 10-13, Takashima 2-chome, Nishi-ku, Yokohama-shi, Kanagawa 2200011 (JP).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),

[Continued on next page]

(54) Title: BROADBAND WAVELENGTH MULTIPLEXING AND DEMULTIPLEXING FILTER AND OPTICAL SPLITTER WITH OPTICAL SIGNAL MULTIPLEXING AND DEMULTIPLEXING FUNCTION



(57) Abstract: Two Mach-Zehnder optical interferometer circuits 13a and 13b are accurately point-symmetrically connected to each other to form a first point-symmetrically connected optical interferometer circuit 5 constituting a light input side circuit 1. Optical signals having a plurality of wavelengths are input to a light input terminal 17. A second point-symmetrically connected optical interferometer circuit 7 having the same functional structure as the first point-symmetrically connected optical interferometer circuit 5 is connected to a through port 18, which is an output terminal of the light input side circuit 1, as a first light output side circuit 2. A cross port 19, which is the other output terminal of the light input side circuit 1, is connected to a second light output side circuit 3 having at least one of Mach-Zehnder optical interferometer circuits 13c and 13d whose transmittance characteristics are different from those of the Mach-Zehnder optical interferometer circuits 13a and 13b.

**WO 2005/071453 A1**



European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

**Published:**

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.